

A NEW SPECIES OF AUSTRALIAN *PACHYHALICTUS* COCKERELL (HYMENOPTERA: HALICTIDAE)

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Abstract

Pachyhalictus albipilatus sp. nov. is described from north Queensland and compared with *P. stirlingi* (Cockerell). New distributional records for the latter species are presented.

Introduction

Pachyhalictus Cockerell, known from 31 species found mainly in the Asiatic tropics, has one described species in Australia, *P. stirlingi* (Cockerell) (Walker 1993). The genus is characterised, in both sexes, by coarsely reticulate sculpture markings on the frons, vertex, mesoscutum and scutellum (See Michener 1978 for full generic character listing and Walker 1993 for character comparison with *Homalictus* Cockerell). *Pachyhalictus* is unique within the Australian Halictini in possessing strong venation in the forewing submarginal cells of the female. In addition, the fused first and second hind tarsal segments of the male is a highly unusual character. Examination of *Pachyhalictus* specimens collected on and in conjunction with the 1992 "Heathlands" expedition to Cape York Peninsula, revealed seven specimens of an undescribed species. This second species, *P. albipilatus* sp. nov., is described and compared with *P. stirlingi*.

Terminology and abbreviations

The terminology of morphological features follows Walker (1993). Abbreviations: ANIC Australian National Insect Collection; AOD Antennocular distance; CL Clypeal length; EW Eye width, in side view; FL Flagellum length; GW Genal width, in side view; HL Head length; HW Head width; IAD Interantennal distance; IOD Interocellar distance; LID Lower interorbital distance; OAD Ocellantennal distance; OOD Ocellocular distance; S2-S8 metasomal sterna 2-8; SL Scape length; T1-T6 metasomal terga 1-6; UID Upper interorbital distance.

Pachyhalictus Cockerell

'*Halictus nomiiformes*' Vachal, 1894: 428; Blüthgen, 1926: 400; 1931: 286.

Pachyhalictus Cockerell, 1929: 589 (Type species *Halictus merescens* Cockerell by original designation); Michener, 1978: 515 [full generic description].

Pachyhalictus albipilatus sp. nov.

(Figs 1-3, 7, 9-14)

Types. QUEENSLAND: *holotype* ♀, Schramm Ck (12°22'S 142°37'E), 17-21.viii.1992, J. Cardale & P. Zborowski (ANIC); *paratypes* (2♂♂, 4♀♀): 1♀, Cockatoo Ck. Xing, 17km NW of Heathlands (11°39'S 142°27'E), 7.vi-25.vii.1992, P. Zborowski & E. Nielsen, Malaise #5 open forest; 2♂♂ same data as holotype; 2♂♂, Moreton HS (12°27'S 142°38'E), 22.viii.1992,

J. Cardale & P. Zborowski; 1♀, 5km SSE of Helenvale (15°44'S 145°15'E), 25.viii.1992, J. Cardale & P. Zborowski, on *Xanthorrhoea* flowers. (All ANIC).

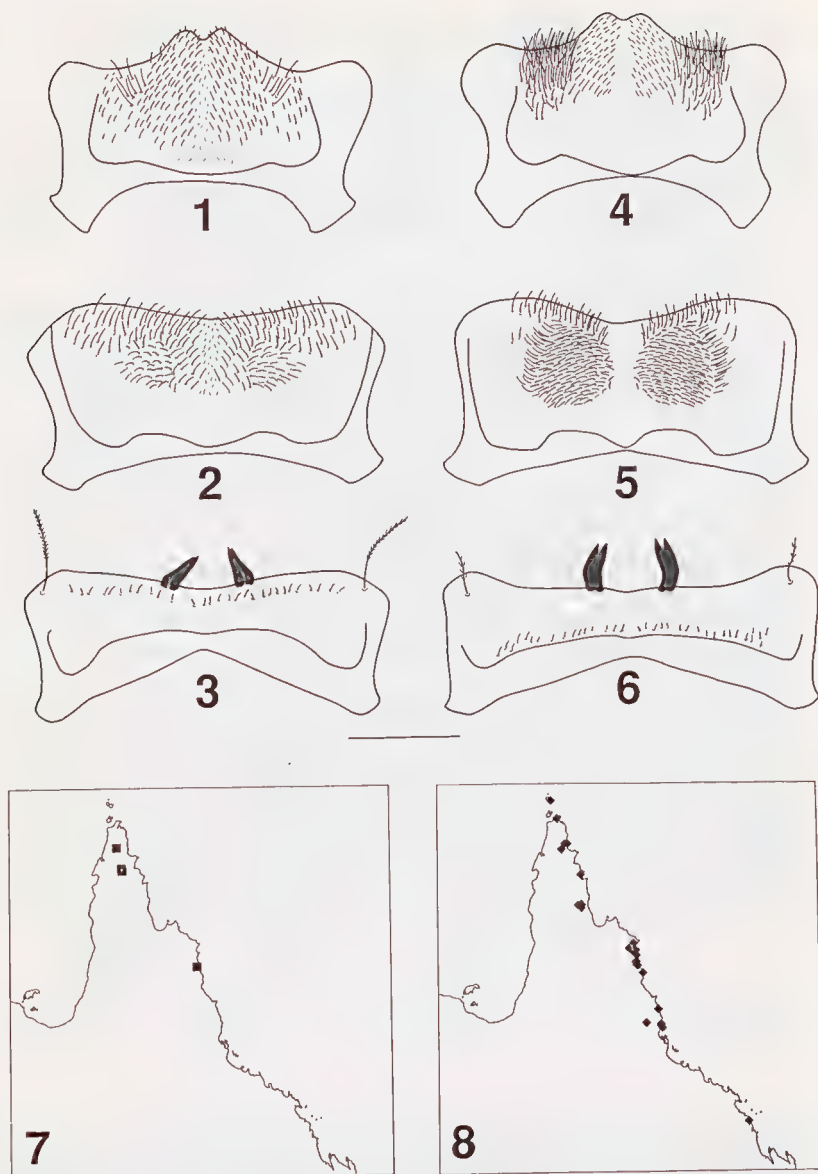
Diagnosis. Both sexes small, robust and black with frons, vertex, mesoscutum and scutellum coarsely reticulate; white tomentum on posterolateral areas of mesoscutum, metanotum, T2-T3 laterally (male), across T2-T4 (female); female with three teeth on inner hind tibial spur; male with S4 median bristles 1.2 x width of median ocellus, S5 setal pads with sparse vestiture.

Description. Female. Body length: 6.78-7.01 mm (\bar{x} =6.88 mm SD=0.12 n=3), (measurements of holotype in bold - **6.85** mm). Forewing length: 1.69-1.74 mm (\bar{x} =1.72 mm SD=0.03 n=3), (**1.69** mm). Head width: 2.26-2.30 mm (\bar{x} =2.28 mm SD=0.02 n=3), (**2.28** mm). Relative measurements: HW: 100; HL: **80-82**; UID: **55-56**; LID: **49-50**; AOD: **18-19**; IAD: **10-11**; OAD: **32-33**; IOD: **15-16**; OOD: **14-15**; CL: **18-19**; GW: **14-15**; EW: **25-27**; SL: **36-37**; FL: **64-66**.

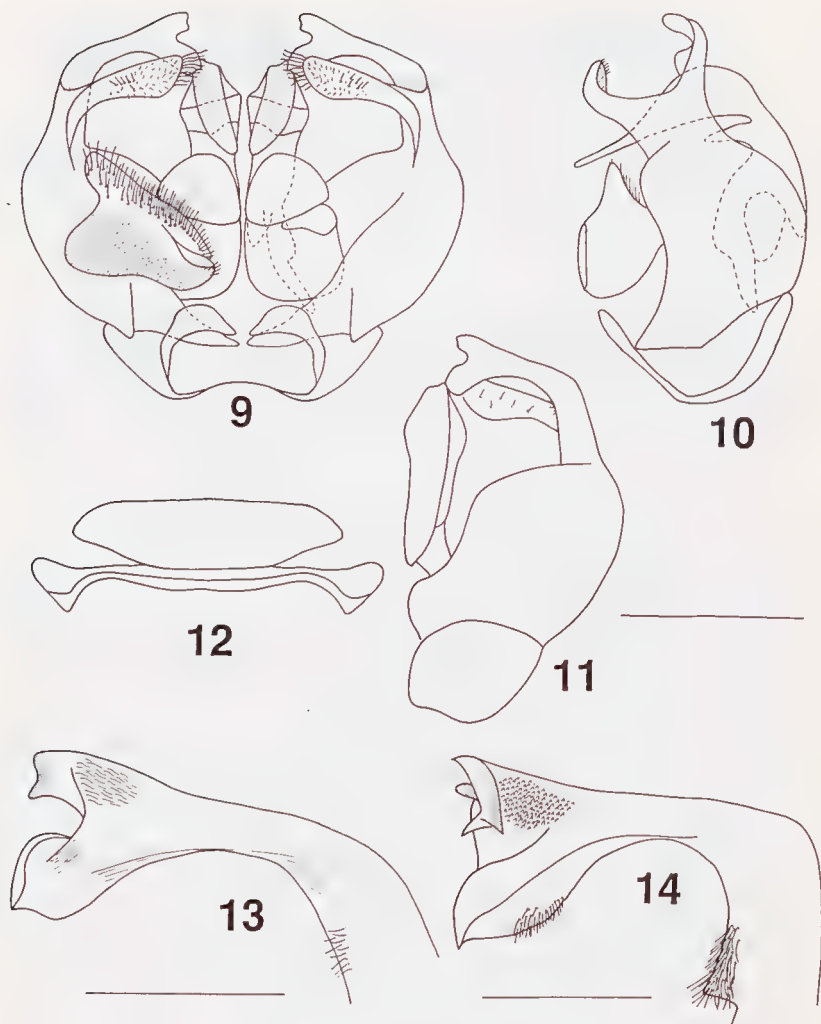
Structure. Frons, vertex, mesoscutum and scutellum coarsely reticulate; head broad, 0.80 x as broad as long; inner orbits converging below; median frontal carina extends 0.8 x to median ocellus; eyes with sparse cover of minute setae; scape reaches anterior margin of median ocellus; clypeus weakly concave along midline, strongly convex in side view, less than half extends below lower level of eyes, coarsely sculptured, punctate mesially, remainder with medially directed longitudinal striae; supraclypeal area protuberant and rounded, covered with reticulate pattern and weakly punctured. Labrum distal process triangular, smooth sided, tapering to pointed apex, median keel weakly flanged distally, fimbrial setae acutely pointed. Pronotum dorsolateral angles well projected and weakly obtuse; anterior half of mesepisternum reticulate, remaining mesepisternum and metepisternum striate; dorsal surface of propodeum length 0.75 x length of scutellum, sculpture coarsely areolate, posteromesial margin truncate, posterior and lateral margins defined by large carinae; hind basitibial plate well defined, apically acute; inner hind tibial spur pectinate with 3 large, rounded, apically directed teeth; T1 shining, mesial area and apical margin impunctate, remainder closely to densely punctate; remaining terga densely punctate.

Colour. Body black, mandibles dark red at apex, antennal flagellar segments and legs brown; some specimens with apical half of hind tibiae light red-brown; metanotum and metasoma tomentum white.

Vestiture. Frons with sparse, short, erect, branched hairs, paraocular areas with dense cover of adpressed plumose hair, genae with cover of both erect and adpressed branched hair except apically with some long, erect, simple hairs; mesoscutum with sparse cover of short, brown, erect, branched hair, except posterolateral tufts of tomentum; metanotum densely tomentose;



Figs 1-6. *Pachyhalictus* male metasomal sterna, (1-3) *P. albipilatus*., (4-6) *P. stirlingi*; (1, 4) S6; (2, 5) S5; (3, 6) S4. Scale line = 0.5mm. Figs 7-8. Known distributions of: (7) *P. albipilatus*; (8) *P. stirlingi*.



Figs 9-14. *Pachyhalictus* male genitalia: (9-12) *P. albipilatus*: (9) ventral view (note: left penis valve and volsella only partly drawn, right retrorse lobe omitted); (10) lateral view of male genitalia; (11) half dorsal view; and associated sterna: (12) S7 & S8. (13-14) Enlargement of ventral surface of the right gonostylus dorsal lobe, (13) *P. albipilatus*; (14) *P. stirlingi*. Upper scale line for Figs 9-12 = 0.5mm; scale lines beneath Figs 13-14 both = 0.2mm.

dorsal surface of propodeum posterolateral areas with moderate cover of erect, branched hairs; T2-T4 with tomentum extending across tergum.

Male. Body length: 5.78-6.24 mm (\bar{x} =5.95 mm SD=0.20 n=4). Forewing length: 1.41-1.50 mm (\bar{x} =1.46 mm SD=0.04 n=4). Head width: 1.81-1.93 mm (\bar{x} =1.86 mm SD=0.05 n=4). Relative measurements: HW: 100; HL: 82-85; UID: 58-62; LID: 46-47; AOD: 17-18; IAD: 12-13; OAD: 31-32; IOD: 16-17; OOD: 15-16; CL: 20-21; GW: 14-15; EW: 26-27; SL: 29-30; FL: 75-78.

Structure. Differs from female as follows: dorsal surface of propodeum areolate sculpture more compact and coarser; mandibles simple; eyes converging strongly below; scape extends to just short of anterior margin of median ocellus; labrum less developed, distal process weakly projected, with small median projection, median keel absent; pronotum dorsolateral angles bluntly acute; dorsal surface of propodeum 0.85 x length of scutellum; hind basitibial plate absent; inner hind tibial spur serrate with at least ten small, apically directed teeth; T1 openly to sparsely punctate except impunctate mesially and along apical margin; tomentum present on lateral areas of T2-T3; T6 (pygidial plate) posterior margin with raised carina; S6 with sparsely setose lateral hair tufts, median area with sparse vestiture (Fig. 1); S5 weakly concave along midline, median area with sparse vestiture, either side of midline with sparse cover of erect, simple hair forming two broadly rounded setal pads, median area with sparse vestiture (Fig. 2); S4 underneath and hidden by S3, S4 with two erect, acutely pointed bristles of similar length (approx. 0.18 mm) on either side of midline, lateral margins each with single, small, weakly branched bristle/hair approximately twice length of admedian bristle length (Fig. 3); S2-S3 with plumose hairs arising across apical margin; remaining vestiture similar to female except long, branched hairs on genae, metanotum tomentum reduced so that lateral areas hairless, T2-T3 with lateral tomentum only; fore, mid and hind trochanters and fore femora with long, branched hairs from ventral surface, hind leg and sternal scopae absent; first and second hind tarsal segments fused.

Colour. Body black except mandibles dark red apically, antennal flagellar segments brown underneath, tarsal segments light brown, T6 (pygidial plate) yellow red-brown.

Genitalia and associated sterna (Figs 9-13). Gonocoxites broad, gonobase narrow, gonostyli strongly bifid, retrorse lobes well developed, sparsely setose on inner basal margin only; volsellae lightly sclerotised ventroapically; penis valves flanged dorsally, inferior basal process well developed; S7 & S8 weakly sclerotised, both broad, without median process.

Distribution (Fig. 7). Cape York Peninsula and north Queensland.

Etymology. The epithet *albipilatus* means "with white hair" and refers to the colour of the mesosomal and metasomal tomentum.

Discussion

Pachyhalictus albipilatus closely resembles *P. stirlingi* and, although the known distributions are sympatric (Figs 7-8), the two species have not been collected together. (The distribution map of *P. stirlingi* combines locality data listed in Walker (1993) and additional records (Appendix 1) from the "Heathlands" and other expeditions.). Females of *P. albipilatus* may be distinguished from *P. stirlingi* by the white tomentum on the metanotum and terga (bright yellow to pale yellow on *P. stirlingi*) and the presence of three teeth on the inner hind tibial spur (six teeth on *P. stirlingi*). Similar vestiture colour differences allow separation of males. Additional male characters include: *P. albipilatus* S6 with sparsely setose lateral hair tufts and median area with sparse vestiture (Fig. 1), *P. stirlingi* S6 with densely setose lateral hair tufts and median area hairless (Fig. 4); *P. albipilatus* S5 with sparsely setose setal pads and median area with sparse vestiture (Fig. 2), *P. stirlingi* S5 with densely setose setal pads and median area hairless (Fig. 5); *P. albipilatus* S4 with admedian bristle length 1.2 x width of median ocellus and lateral bristle length at least twice (2.1 x) admedian bristle length (Fig. 3), *P. stirlingi* S4 admedian bristle length 1.7 x width of median ocellus and lateral bristle length less than (0.86 x) median bristle length (Fig. 6); and male genitalia of *P. albipilatus* with ventral surface of dorsal gonostyli lobes with median area plicate, basal distal margin without hair and contours of inner proximal margin of gonostyli arms curved (Fig. 13), *P. stirlingi* with median area with area of apically pointed prominences, basal distal margin setose and contours of inner proximal margin of gonostyli arms angulated (Fig. 14). Michener (1978) presented a generic overview of *Pachyhalictus* noting specific exceptions to various character states. The character suite for the two Australian *Pachyhalictus* species complements Michener's character list with the exception that, although male S4 lateral bristles are present, they are substantially reduced and can not be described as 'enormous', as is often found in non-Australian members of the genus.

Acknowledgments

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Appendix 1

Pachyhalictus stirlingi locality data not recorded in Walker (1993).

QUEENSLAND: 1♀, 12 km SSE Heathlands (11°51'S 142°38'E), 26.i-1.iii.1992, P. Feehney, closed forest Malaise #3, #4; 2♂♂, 8 km NW of Bald Hill (13°45'S 143°22'E), McIlwraith Range, 420m, 27.vi-12.vii.1989, I. Naumann, sweeping mango tree site; 1♀, 11 km NW of Bald Hill (13°44'S 143°20'E), McIlwraith Range, 500m, 26.vi-13.vii.1989, I. Naumann, Malaise trap/ethanol; 4♀♀, 15 km NWW of Bald Hill (13°43'S 143°19'E), McIlwraith Range, 420m, 27.vi-12.vii.1989, I. Naumann, weather station site, monsoon-rainforest interface site. (All specimens lodged in ANIC).